

Remarks

Entry of this amendment and allowance of all claims are respectfully requested. Claims 1-16, 18-30 & 32-38 remain pending.

By this amendment, independent claims 1, 18 & 32 are amended to clarify that each encoder receives for encoding the identical video data of the sequence of video frames, in accordance with Applicants' invention. Support for this amendment can be found throughout the application as filed. For example, reference paragraph [0047] thereof. Additionally, each of these independent claims is amended to recite that each set of encode parameters includes multiple types of encode parameters, with at least one type of encode parameter of the sets of encode parameters being varied between the at least two encoders. Again, support for this amendment can be found throughout the application as filed. For example, reference dependent claims 4 & 20, as well as paragraph [0048] of the specification. No new matter is added to the application by any amendment presented.

In the new Office Action, claims 1-11, 18-24, 26-27 & 32-38 were rejected under 35 U.S.C. §102(b) as being anticipated by Hang (U.S. Patent No. 5,115,309; hereinafter Hang); while claims 11, 13-16, 25 & 28-30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Hang, further in view of Park et al. (U.S. Patent No. 5,528,628; hereinafter Park). These rejections are respectfully, but most strenuously, traversed to any extent deemed applicable to the amended claims presented herewith, and reconsideration thereof is requested.

Initially, Applicants respectfully submit that the Office Action fails to present a *prima facie* rejection to claim 12 of the application. Neither of the stated rejections appears to include claim 12; however, at page 5 of the Office Action indirect reference to claim 12 is made in stating the obviousness rejection of claims 11, 13-16, 25 & 28-30. Notwithstanding this, Applicants respectfully submit that a *prima facie* case of anticipation or obviousness against claim 12 is not stated in the Office Action, and as such, an indication of allowability therefore is requested. In view of this Office Action deficiency, Applicants respectfully request clarification in a non-final paper should the Examiner deem further action necessary notwithstanding the Remarks presented herein.

With respect to the anticipation rejection, it is well settled that there is no anticipation of a claim unless a single prior art reference discloses: (1) all the same elements of the claimed invention; (2) found in the same situation as the claimed invention; (3) united in the same way as the claimed invention; and (4) in order to perform the identical function as the claimed invention. In this instance, Hang clearly fails to disclose various aspects of Applicants' invention as recited in the independent claims presented, and as a result, does not anticipate (or even render obvious) Applicants' invention.

Hang describes a dynamic channel allocation unit for specifying a bit rate for each video coder in a set of parallel video coders comprising an overall video coder. The dynamic channel allocation unit is supplied from each individual video coder with an average from quantization step size for the previous frame and the average number of bits produced per pel. For the current image frame, the dynamic channel allocation unit computes a set of channel sharing factors, i.e., the percentage of the total channel bandwidth, to be allocated to a particular video coder. One channel sharing factor is computed for each individual video coder. Individual members of the set of channel sharing factors may be further refined to reflect the prior history of the channel sharing factor for their corresponding coder. (See Abstract of Hang.) Further, FIG. 1 of Hang illustrates VIDEO IN 105 proceeding to a video splitter 101, which divides the video picture into sub-pictures identified as sub-video 1, sub-video 2 ... sub-video N, each of which is then forwarded to a respective video coder. The splitting of a video frame is accomplished by spatial decomposition or, alternatively, by employing a sub-band frequency decomposition. (See column 3, lines 28-50 of Hang.) Each sub-video signal corresponds to a video signal comprising one of the N sub-images.

Initially, Applicants respectfully submit that Hang fails to teach or suggest multiple encoders connected in parallel, *wherein each encoder receives for encoding the identical video data of the sequence of video frames*, as recited in their independent claims. The sub-video signals forwarded from video splitter 101 (see FIG. 1 of Hang) clearly comprise distinct portions of the video in signal. Thus, each video coder in Hang receives a different portion of the video data of the sequence of video frames for encoding. For at least this reason, Applicants respectfully request reconsideration and withdrawal of the anticipation rejection to the independent claims presented.

Additionally, Applicants recite in each of the independent claims that a controller is coupled to the multiple encoders *for selecting one set of encode parameters from the sets of encode parameters which best meets an encode objective*. In rejecting this functionality, the Office Action references element 109-1 of FIG. 1 in Hang, without explanation. Element 109-1 in Hang is a line coupling dynamic channel allocation 103 to video coder 1. Assuming for a moment that the line is a control signal from the dynamic channel allocation block to the video coder block, it is respectfully submitted that there is no teaching or suggestion in such a depiction or the supporting discussion that the control signal is designed to select one set of the encode parameters employed by the multiple parallel connected encoders which best meets an encode objective. Such a conclusion is contrary to the express teachings of Hang. In Hang, each video coder encodes a different portion of the “video in” data after being split. To allege that one set of encode parameters employed by one of the parallel connected encoders is selected by the controller, and that the one set of encode parameters best meets an encode objective, is illogical. Such a facility is not relevant to the teachings of Hang, and it is respectfully submitted that the Office Action is merely setting forth a hindsight rejection of Applicants’ claimed invention based upon Applicants’ own subject matter. For this additional reason, reconsideration and withdrawal of the anticipation rejection to the independent claims is requested.

Still further, each independent claim recites a facility for *automatically adapting an encode parameter of one or more encoders of the multiple encoders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective*. In rejecting this subject matter, the Office Action references A, B of FIGS. 9 & 10, and notes Box 1119 of FIG. 10 of Hang. Box 1119 of FIG. 10 is an inquiry determining whether ALL_DONE equals TRUE. This conditional branch tests if the value of ALL_DONE is equal to TRUE. If so, then the routine is exited. If “no”, control is passed back to step 1103, which reinitializes the temporary variables and repeats the above-described loops. However, this repeating of the above-described loop does not equate to an automatic adaption of parameters employed by the video coders when no set of encode parameters of the sets of encode parameters employed by the multiple encoders produces an encoded result which meets the encode objective.

For this additional reason, reconsideration and withdrawal of the anticipation rejection to the independent claims presented is requested.

In view of the above, Applicants respectfully submit that the independent claims presented herewith patentably distinguish over the teachings of Hang, and withdrawal of the anticipation rejection based thereon is requested.

The dependent claims are believed allowable for the same reasons as the independent claims, as well as for their own additional characterizations.

With respect to the obviousness rejection to claims 11, 13-16, 25 & 28-30, Applicants respectfully submit that these dependent claims are allowable for the reasons noted above with respect to the independent claims. The Park patent does not teach or suggest the above-noted deficiencies of Hang when applied against the independent claims presented.

Park describes an apparatus for variable-length-coding and variable-length-decoding using a plurality of Huffman coding tables. Each table has a symbol-code word association different from the other tables according to statistics regarding the symbols and a variable-length-coding device for coding the input symbols according to each of the variable-length-code tables for every block in a predetermined block data unit, for generating code words. (See Abstract of Park.)

Applicants note that the Park reference is cited in the Office Action with respect to the subject matter of dependent claims 11, 13-16, 25 & 28-30. Without acquiescing to the characterizations of the teachings of Park, it is noted that the Park patent does not address the above-noted deficiencies of Hang when applied against the independent claims at issue. Thus, these dependent claims are believed allowable for the same reasons noted above with respect to the independent claims from which they directly, or ultimately depend. Withdrawal of the obviousness rejection to these claims is therefore respectfully requested.


By way of further example, dependent claims 4 & 20 recite that the at least one type of encode parameter of the sets of encode parameters is varied between the at least two encoders of the multiple encoders is actually two or more of: a bit rate for a resultant encoded stream; field or frame encoding; group picture structure, including number of B pictures and distance between I pictures; and 3:2 pull-down inversion. With respect to these claims, Hang is again cited. However, it is respectfully submitted that only the bit rate in Hang is varied between the video coders connected in parallel. If one of the other noted parameters were to be varied, then the resultant picture obtained by Hang would be unintelligible. There must be a same field and frame coding, same GOP structure and same 3:2 pull-down inversion employed by each of the video coders in Hang since the coders are each encoding a different portion of the picture. To vary these parameters between portions would result in an unintelligible output. As such, reconsideration and withdrawal of the anticipation rejection to these claims is requested.

Further, dependent claims 11, 26 & 37 recite that the means for outputting includes an encode subsystem that is separate from the multiple parallel encoders and that subsequently encodes the sequence of video frames using the one set of encode parameters ascertained from the multiple parallel connected encoders to produce the bitstream of encoded video data. Thus, in accordance with this aspect of the present invention, the multiple parallel connected encoders are a pre-encode stage wherein the different sets of encode parameters employed by the different encoders are evaluated and the one set of encode parameters selected by the controller which best meets the encode objective is then used in the encode subsystem to actually encode the sequence of video frames. No similar facility is believed taught or suggested by Hang and/or Park, alone or in combination. Support for the language of these amended claims can be found in FIG. 6 of the application and the supporting discussion thereof.

For at least the reasons noted above, all claims are believed to be in condition for allowance.

Applicants' undersigned attorney is available should the Examiner wish to discuss this application further. The application is believed to be in condition for allowance and such action is respectfully requested.

Respectfully submitted,



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Dated: January 05, 2006.

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